

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for April, 1888, is exhibited on chart ii by dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal, and subtracting when above.

In the northern districts from Minnesota eastward to New England and the Maritime Provinces of Canada the month was colder than the average. The deficiencies in the mean temperatures over about half of the area of the districts mentioned are less than 2°, and the only stations with long records showing deficiencies greater than 4° are Saint Paul, Minn., and Portland, Me. In the Southern States and, with the exception of the extreme northwest, over the whole region between the Mississippi River and the Pacific coast the month was warmer than the average, the excess over the normal temperatures amounting to 6°, or more, in northern California and over nearly all of the Rocky Mountain region. In the Southern States the mean temperatures generally ranged about 2° above the normal, except along the immediate coast, where the departures were less marked.

The following are some of the most marked departures from normal temperatures at Signal Service stations:

Above normal.		Below normal.	
Red Bluff, Cal.....	8.9	Saint Paul, Minn.....	5.5
Cheyenne, Wyo.....	7.8	Portland, Me.....	4.8
Winnemucca, Nev.....	7.6	Quebec, Quebec.....	4.0
Boisé City, Idaho.....	7.5	La Crosse, Wis.....	3.9
Salt Lake City, Utah.....	7.5	Marquette, Mich.....	3.8
Yuma, Ariz.....	6.3	Wood's Holl, Mass.....	3.7
Prescott, Ariz.....	6.3	Albany, N. Y.....	3.4
Denver, Colo.....	6.2	Kingston, Ont.....	3.0

By reference to the table of comparative maximum and minimum temperatures it will be seen that in numerous instances the maximum temperatures were higher than have previously been recorded in April since the establishment of Signal Service stations. The temperatures were remarkably high in California from the 12th to 14th, the maximum at Los Angeles, San Diego, and San Francisco being the highest April temperatures on the records of these stations. In the upper Ohio valley and in the Atlantic coast states, during the warm period of the 28-30th, the maximum temperatures were the highest April temperatures yet recorded, Baltimore, Md., Norfolk, Va., and Charlotte, N. C., reporting temperatures ranging from 90° to 93° on the 29th and 30th, being the highest April temperatures by from 1° to 2° on record at those stations. The minimum temperatures of the month were unusually low in some parts of the country. Those attending area of high pressure number ii in the Lake region and New England from the 6th to the 9th were from 10° to 20° below the freezing point, and at some stations on the New England coast were within 2° of the lowest ever recorded in April. At Fort Buford, Dak., on the 2d, a minimum of 6° was recorded, which is 4° lower than the previous April minimum of ten years' observations. Minimum temperatures on the north Pacific coast were also unusually low.

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. Along the Gulf coast and on the Pacific coast north of the fortieth parallel the monthly ranges were less than 30°, the least, 18°, being reported from Key West, Fla. In the extreme northwest they exceeded 70°, the greatest, 89°, occurring at Poplar River, Mont.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperatures for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for April, 1888; (4) the departures of the current month from the normal; (5) and the extreme monthly means for April during the period of observations and the year of occurrence:

State and Station.	County.	(1) Normal for the month of April.	(2) Length of record.	(3) Mean for April, 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for April.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
<i>Arkansas.</i>		°	Years		°				
Lead Hill	Boone	61.3	6	65.3	+4.0	65.3	1888	56.7	1884
Washington	Hempstead	63.4	20	67.0	+3.6				
<i>California.</i>									
Sacramento	Sacramento	59.2	22	59.5	+0.3	64.2	1875	53.3	1880
Salinas	Monterey	53.6	15	54.2	+0.6	58.9	1883	50.5	1882
<i>Florida.</i>									
Merritt's Island	Brevard	70.9	5	71.8	+0.9	74.9	1885	70.4	1887
<i>Illinois.</i>									
Riley	McHenry	44.4	27	43.7	-0.7				
Peoria	Peoria	52.3	32	53.6	+1.3				
<i>Indiana.</i>									
Vevay	Switzerland	54.8	21	56.1	+1.3	61.8	1866	47.4	1874
Logansport	Cass	53.0	34	52.0	-1.0				
Spiceland	Henry	50.0	34	52.5	+2.5				
Blue Lick	Clark	55.2	11	56.5	+1.3				
<i>Iowa.</i>									
Independence	Buchanan	48.0	12	46.6	-1.4	51.0	1878	44.0	1877
Cresco	Howard	43.5	16	42.5	-1.0				
Monticello	Jones	48.1	34	47.3	-0.8	56.0	1855	38.0	1857
<i>Kansas.</i>									
Independence	Montgomery	57.1	17	56.1	-1.0	61.7	1878	48.3	1874
Lawrence	Douglas	54.2	20	57.6	+3.4	58.6	1878	47.7	1874
Wellington	Sumner	55.9	10	59.3	+3.4	59.6	1880	50.7	1884
<i>Louisiana.</i>									
Grand Coteau	Saint Landry	68.6	6	70.6	+2.0				
Point Pleasant	Texas	66.0	8	68.0	+2.0				
<i>Maine.</i>									
Gardiner	Kennebec	41.3	52	38.2	-3.1	45.9	1878	35.0	1874
<i>Maryland.</i>									
Cumberland	Alleghany	51.4	16	50.3	-1.1	57.6	1881	45.0	1874
<i>Massachusetts.</i>									
Somerset	Bristol	45.3	18	44.0	-1.3				
Worcester	Worcester	44.2	50	39.5	-4.7				
<i>Michigan.</i>									
Thornville	Lapeer	45.9	12	42.3	-3.6				
Kalamazoo	Kalamazoo	46.5	13	45.7	-0.8				
Adrian	Lenawee	45.8	11	45.3	-0.5				
<i>Nevada.</i>									
Carson City	Ormsby	48.4	9	53.3	+4.9	56.1	1881	43.1	1880
<i>New Jersey.</i>									
South Orange	Essex	48.2	18	46.2	-2.0	52.9	1878	42.2	1874
<i>New York.</i>									
North Volney	Oswego	41.2	21	38.6	-2.6	50.9	1878	33.6	1874
Palermo	Oswego	41.1	35	38.2	-2.9	50.0	1878	32.4	1874
<i>Ohio.</i>									
Wauseon	Fulton	46.3	18	46.3	0.0	54.8	1878	38.6	1874
<i>Oregon.</i>									
Albany	Linn	50.8	10	53.5	+2.7	54.5	1881	40.9	1883
Eola	Polk	49.6	18	52.7	+3.1				
<i>Pennsylvania.</i>									
Dyberry	Wayne	42.0	23	40.3	-1.7	50.5	1878	35.0	1874
Wellsborough	Tioga	42.8	10	42.1	-0.7	46.2	1880	38.2	1878
<i>Tennessee.</i>									
Milan	Gibson	60.0	6	63.0	+3.0				
<i>Texas.</i>									
New Ulm	Austin	68.4	16	70.9	+2.5	71.4	78, '80	63.6	1875
<i>Vermont.</i>									
Strafford	Orange	40.7	14	37.9	-2.8	48.3	1886	35.7	1875
<i>Virginia.</i>									
Bird's Nest	Northampt'n	54.8	19	52.5	-2.3	61.6	1880	49.4	1875
Wytheville	Wythe	52.2	24	54.3	+2.1	56.0	1866	47.0	1881
Variety Mills	Nelson	53.8	11	53.1	-0.7	58.3	1878	51.2	1887
<i>West Virginia.</i>									
Helvetia	Randolph	48.4	12	48.1	-0.3				

FROST.

Frosts, which were reported in some part of the country on every day during the month, occurred most extensively from the 10-13th; they were least extensively reported during the last three days of the month. The frosts of the 24th to 27th in Virginia caused much damage to garden truck in the southern part of the state. A statement from Norfolk on the 26th, which was extensively published in the newspapers, placed the damage done in that vicinity at half a million of dollars. In the Southern States and California frost occurred as follows:

Alabama.—Auburn, 12th, 21st; New Market, 13th, 14th, 21st, 22d, 24th, 25th.

Arkansas.—Eureka Springs, 13th; Lead Hill, 13th, 21st.

California.—Georgetown, 6th; Riverside, 5th; Sacramento, 1st, 5th, 7th, 26th; Willows, 1st, 2d.

Florida.—Archer, 15th.

Georgia.—Athens, 21st, 25th; Atlanta, 21st; Forsyth, 21st, 22d, 25th, 26th.

North Carolina.—Charlotte and Raleigh, 21st, 24th to 26th; Flat Rock, 25th, 26th; Lenoir, 13th, 14th, 24th, 25th; Statesville, 21st, 24th to 26th; Wash Woods, 17th, 26th; Weldon, 9th, 17th, 21st, 24th to 27th.

South Carolina.—Cedar Springs, 21st, 25th to 27th; Stateburg, 21st, 25th, 26th.

Tennessee.—Ashwood and Milan, 13th, 21st, 25th; Memphis, 21st; Nashville, 13th, 21st.

Texas.—Cleburne, Decatur, and Silver Falls, 30th.

Table of comparative maximum and minimum temperatures for April.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Alabama.....	Mobile.....	84.0	50.0	90.0	1883	32.0	1881	18
Do.....	Montgomery.....	86.6	44.0	90.0	1880	30.0	1881	16
Arizona.....	Prescott.....	78.5	31.3	86.0	1879	13.0	1878	12
Do.....	Fort Apache.....	83.0	30.0	89.0	1879	15.0	1883	10
Arkansas.....	Fort Smith.....	89.7	41.5	91.3	1887	30.0	1887	6
Do.....	Little Rock.....	86.0	43.0	94.0	1880	28.2	1886	9
California.....	San Francisco.....	87.7	46.0	81.0	1876	40.0	1875	18
Do.....	San Diego.....	93.0	47.0	87.0	1876	39.0	1875	17
Colorado.....	Denver.....	80.6	30.0	83.0	1874	4.0	1876	16
Do.....	Montrose.....	76.0	28.8	83.0	1885	18.5	1886	3
Connecticut.....	New Haven.....	77.5	25.4	83.0	1885	16.0	1874	16
Do.....	New London.....	68.0	25.5	79.4	1881	19.0	1874	17
Dakota.....	Fort Buford.....	82.2	3.5	92.0	1881	7.0	1880	10
Do.....	Yankton.....	84.8	24.2	90.1	1887	3.0	1881	16
Dis. of Columbia.....	Washington City.....	89.0	31.8	90.0	1872	22.5	1875	18
Florida.....	Jacksonville.....	88.0	49.0	91.0	1880	37.0	1881	17
Do.....	Key West.....	82.5	64.5	88.1	1881	61.0	1873, 1881	18
Georgia.....	Atlanta.....	84.3	39.7	88.1	1887	25.0	1881	10
Do.....	Savannah.....	88.1	47.8	89.0	1887	33.0	1881	18
Idaho.....	Boise City.....	88.1	25.0	86.3	1887	17.5	1883	11
Illinois.....	Cairo.....	82.5	40.0	89.0	1872	24.0	1875	17
Do.....	Chicago.....	83.0	30.0	83.0	1873	17.0	1881	16
Indiana.....	Indianapolis.....	83.3	30.9	85.3	1883	19.0	1875	16
Indian Ter.....	Fort Sill.....	92.2	36.5	96.0	1880	26.0	1881	10
Iowa.....	Dubuque.....	81.6	28.5	84.0	1879	13.8	1886	15
Do.....	Des Moines.....	79.6	21.4	89.0	1883	11.0	1881	10
Kansas.....	Dodge City.....	89.8	31.0	92.0	1880	13.0	1881	14
Do.....	Leavenworth.....	87.4	29.5	89.0	1880	13.0	1881	17
Kentucky.....	Louisville.....	84.8	32.5	88.5	1883	21.0	1875	16
Louisiana.....	New Orleans.....	85.0	56.3	86.8	1887	38.0	1881	18
Do.....	Shreveport.....	87.0	46.0	90.2	1887	32.0	1881	16
Maine.....	Eastport.....	55.6	12.9	71.3	1886	2.0	1874	16
Do.....	Portland.....	64.5	15.5	78.0	1881	14.0	1874	17
Maryland.....	Baltimore.....	90.0	32.8	87.8	1886	23.5	1875	16
Massachusetts.....	Boston.....	66.0	20.8	85.0	1872	11.0	1874	18
Michigan.....	Marquette.....	61.8	13.5	81.5	1887	3.0	1875	14
Do.....	Grand Haven.....	74.0	37.6	80.0	1883	9.0	1874	16
Minnesota.....	Saint Vincent.....	77.2	5.8	83.5	1887	14.4	1874	8
Do.....	Saint Paul.....	76.0	22.6	84.2	1887	7.0	1874	16
Mississippi.....	Vicksburg.....	85.0	45.8	92.0	1887	31.0	1881	16
Missouri.....	Saint Louis.....	87.5	34.8	87.5	1883	22.0	1875	18
Montana.....	Ft. Assinaboine.....	80.0	15.1	81.0	1881	7.0	1881	8
Do.....	Helena.....	78.0	27.5	74.0	1887	6.0	1881	9
Nebraska.....	North Platte.....	88.9	26.2	93.2	1887	12.0	1875	14
Do.....	Omaha.....	86.5	28.0	81.1	1880	6.0	1881	16
Nevada.....	Winnemucca.....	83.2	21.0	81.1	1887	17.0	1883	9
New Jersey.....	Atlantic City.....	74.3	30.3	84.0	1887	19.0	1875	15
New Mexico.....	Santa Fe.....	72.5	29.0	84.0	1879	11.0	1875	16
New York.....	Buffalo.....	66.0	21.4	82.6	1883	11.0	1881	16
Do.....	New York City.....	84.2	29.2	84.0	1886	20.0	1874	17
North Carolina.....	Charlotte.....	91.0	38.3	89.3	1887	28.0	1881	18
Do.....	Wilmington.....	87.5	37.3	90.0	1880	28.0	1875	10
Do.....	Cincinnati.....	84.1	33.4	83.9	1872, 1873	18.0	1875	18
Do.....	Sandusky.....	85.1	28.1	83.9	1886	14.0	1881	10
Oregon.....	Portland.....	83.5	32.0	85.0	1880	28.0	1875	17
Do.....	Roseburg.....	83.8	29.0	84.5	1880	27.5	1887	11
Pennsylvania.....	Pittsburg.....	86.0	25.5	89.2	1885	14.0	1875	16
Do.....	Philadelphia.....	90.7	31.0	87.0	1872	17.5	1874	18
Rhode Island.....	Block Island.....	60.0	26.9	69.9	1885	25.0	1881	8
South Carolina.....	Charleston.....	88.0	50.0	87.0	1880	32.0	1881	16
Tennessee.....	Knoxville.....	84.8	35.5	88.7	1887	24.0	1875	18
Do.....	Memphis.....	86.5	43.0	88.0	1883	27.0	1881	16
Texas.....	Brownsville.....	84.1	60.9	97.8	1886	43.0	1881	13
Do.....	Fort Elliott.....	88.0	37.4	96.0	1880	20.0	1881	9

Table of comparative maximum and minimum temperatures, &c.—Cont'd.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Utah.....	Salt Lake City.....	80.1	31.1	83.0	1874	19.0	1875	15
Virginia.....	Lynchburg.....	88.9	31.3	91.5	1873	25.0	1881	16
Do.....	Norfolk.....	93.1	32.2	92.0	1871	27.0	1875, 1880	18
Washington.....	Spokane Falls.....	79.9	27.3	86.2	1887	26.0	1887	8
Do.....	Olympia.....	78.8	31.0	82.0	1880	27.2	1887	11
Wisconsin.....	La Crosse.....	74.2	26.0	83.0	1879	10.0	1881	16
Do.....	Milwaukee.....	77.9	27.5	82.0	1871	11.6	1886	18
Wyoming.....	Cheyenne.....	76.3	24.6	80.0	1874	2.0	1875	16

TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for April, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Station.	Temperature at bottom.				Mean temperature of air at the station.	Average depth of water in feet and tenths.
	Max.	Min.	Range.	Monthly mean.		
Canby, Fort, Wash.....	79.2	71.0	8.2	75.4	70.6	8.1
Cedar Keys, Fla.....	68.0	53.5	14.5	64.0	65.6	34.0
Charleston, S. C.....	37.3	33.8	3.5	35.5	36.5	16.0
Eastport, Me.....	76.0	65.4	10.6	73.7	71.2	14.7
Galveston, Tex.....	81.7	73.0	8.7	78.8	75.7	17.1
Key West, Fla.....	47.0	35.0	12.0	40.8	47.9	14.5
New York City.....	73.0	66.5	7.5	71.2	69.9	18.6
Pensacola, Fla.....	40.0	33.8	6.2	36.9	39.2	15.6
Portland, Me.....	58.7	46.0	12.7	53.2	55.0	53.1
Portland, Oregon.....						

* No thermometer at station.

COTTON REGION REPORTS.

In the accompanying table are given for April, 1888, means of the maximum and minimum temperatures, and the average rainfall in the cotton regions, together with normals computed from similar observations of former years.

It will be seen that both the maximum and minimum temperatures were in general above the normal.

The rainfall was largely deficient in all districts, with the exception of the Galveston district, where there was a large excess.

Temperature and rainfall data for the cotton districts, April.

Districts.	Rainfall.			Temperature.									
	Average for April of three preceding years.		Departures.	Maximum.				Minimum.				Extremes for April, 1888.	
	Average for April, 1888.	Departures.		Mean for April of three preceding years.		Mean for April, 1888.		Mean for April of three preceding years.		Mean for April, 1888.		Max.	M in.
				Average for April, 1888.	Departures.	Mean for April of three preceding years.	Mean for April, 1888.	Departures.	Mean for April of three preceding years.	Mean for April, 1888.			
Inches	Inches	Inches.	°	°	°	°	°	°	°	°	°	°	
New Orleans.	6.05	1.60	- 4.45	79.1	80.6	+	1.5	58.8	58.8	-	97	42	
Savannah	4.20	0.37	- 3.83	79.7	82.1	+	2.4	58.0	57.5	-	92	41	
Charleston	3.47	1.11	- 2.36	75.9	79.3	+	3.4	53.3	56.1	+	91	37	
Atlanta	5.32	1.44	- 3.88	73.7	77.1	+	3.4	51.3	53.2	+	93	37	
Wilmington	4.00	1.27	- 2.73	71.6	76.0	+	4.4	48.5	49.9	+	85	30	
Memphis	6.07	3.02	+ 3.05	73.0	75.1	+	2.1	52.0	53.1	+	86	38	
Galveston	2.67	7.16	+ 4.49	79.0	77.9	-	1.1	55.7	62.2	+	86	42	
Vicksburg	6.49	1.41	- 5.08	73.7	80.8	+	7.1	55.6	58.5	+	88	46	
Montgomery	5.76	1.45	- 4.31	77.1	80.5	+	3.4	53.5	56.0	+	89	40	
Augusta	4.70	0.91	- 3.79	75.3	78.4	+	3.1	52.5	53.7	+	91	35	
Little Rock	6.06	2.64	- 3.42	74.5	77.3	+	2.8	51.0	54.1	+	91	30	
Mobile	6.75	1.77	- 4.98	78.6	80.9	+	2.3	55.7	54.5	-	92	40	

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for April, 1888, as determined from the reports of about one thousand stations, is exhibited on chart iv. In the

table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the